Relevant Theories In Explaining Land Values*

By

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I believe the title of my paper is a bit presumptuous or if not that, a bit misleading. There are a multitude of theories explaining land values, each of them relevant to some specific purpose and, therefore, worthy of consideration in any discussion of land prices of land market behavior. Not all, however, are well founded in economics and many, given the current state of the data base cannot be tested by empirical techniques.

I view my purpose at these meetings as that of a provocature, rather than as an oracle. I expect to raise more questions than I answer. In order to set the stage, let me review a bit of the history of research on farm real estate values.

During the 1920's, Ernie Wiecking and others in USDA, established a project to monitor land price behavior at the state level. Their intent, as best I can determine, was to provide farmers and policymakers with indicators of the general trend in real estate values. This monitoring function has remained in tack since that time, surviving major changes and reorganization in the Department of Agriculture. The basic data set that has been developed is one of the longest available in USDA and predates such series as Farm Income Statistics and the Balance Sheet of the Farming Sector. Wiecking, Stauber, Regan, and others worked with the early data set and attempted to explore and expand on those factors which seem to explain land price behavior.

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In October 1927, Wiecking wrote "A further decline in values was rather to be expected in view of what transpired in the products' price and income situation during the year 1926. The composite price index of 30 major products.. dropped from 143 to 127 percent of pre war within the year. Net income available for capital invested in the agricultural industry dropped 21 percent...it is recognized that these income data do not necessarily represent the share going to real estate as such, that real estate values cannot be expected to move in unison with these income figures and that other limitations must be observed. They form, however, one set of indicative evidence." (1)

In 1933, Stauber reported that, "Gross farm income from farm production during 1932...reached the lowest level in the available statistical record. Farmers' capital expenditures amounted to about $218,000,000 in 1932, which is about one-quarter of the 1924-29 average.

It was inevitable that farm real estate values should decline further."(2)

In 1948, A. R. Johnson report that "Once again the prices for farmland have gone up and gone up sharply...forces at work throughout the war are now intensified. We have had another year when the average farm income was the highest ever recorded. Production has been large and prices for farm products have been relatively high. Accumulated savings are pressing for investment. Credit is plentiful at relatively low rates of interest, and land investments have been bringing a high rate of return."(3)

In 1957, Scofield wrote, "A complex set of factors has contributed to the rise in farm real estate values since 1954...among these are inflationary pressures, demand for land for nonfarm uses, government programs for Agriculture, and the cost reductions possible for larger units...full employment, improved highways, and the strong desire of city people for country living will likely continue to disperse population and industry into...rural areas. The resulting demand for land as space depends upon nonfarm income and business conditions, rather than on farm income."(4)

Scofield again in 1964 stated, "The paradox of an almost steady rise in market prices for farm real estate for the last decade without an accompanying rise in farm earnings continues to puzzle appraisers, lending agencies, and prospective buyers."(5)

In 1965, Rossmiller asserted "Farm real estate market values in the U.S. have followed an every upward trend since the mid-1930's, despite widely fluctuating and in recent years declining net income. This seemingly strange phenomena has been the fuel for a good bit of controversy in recent years and several hypotheses have been advanced to explain it. The reason for the interest is clear. In an industry where income is low relative to incomes in other sectors of the economy and where absolute decline in income, in several years during the period are in evidence, it seems a bit peculiar that one of the major inputs should exhibit the price behavior pattern that can be attributed to farm real estate."(6)

Reynold in 1966 said, "The lack of a close relationship between net farm income and the value of farmland in recent years indicates that there may be other important factors affecting the value of farmland.

It has been hypothesized that the following factors have accounted for the strength in the value of and demand for farmland:

1. The desire for farmers to enlarge existing farms,
2. generally favorable crop yields, which have offset lower commodity prices,
3. optimism about the desirability of land as an investment, created by a buoyant general economy,
4. a strengthened expectation that the long-term demand for farmland will be favorable because of prospects for a continued high rate of population growth."(7)

Herdt and Cochrane, VanVuuren and others have added to the list such things as; appreciation, technological change, and urbanization.

I return now to Ernie Wiecking's comment in 1927, "It is recognized that these income data do not necessarily represent the share going to real estate as such, that real estate values cannot be expected to move in unison with these income figures and that other limitations must be observed."

Wiecking recognized that net farm income was a poor proxy for net land earnings and that lands share of net income was not a fixed proportion. Between 1927 and 1964, conventional wisdom overcame economic theory to the point, where Scofield found it paradoxical that net income and land values did not move in a parallel manner.

With the concept of such a paradox legitimized by USDA publications, it seemed important to researchers at the time to construct rationales for explaining how such a thing could happen. Perhaps 7 or 8 agricultural economists received their Doctor's Degree for developing such studies, among these, one researcher found that farm programs were the most important factor in explaining the continuing rise in land value. Another determined that farm enlargement, as represented by the average size of farm was a significant contributor, another determined that technological change provided the answer and two other researchers, not graduate students, determined that:

> "The econometric model presented here is only a subset of many possible specifications of the land market. Because more than one set of variables predict land prices well and can be justified from an economic standpoint, the process of selecting the appropriate model is necessarily somewhat subjective and dependent on the judgment of the researcher."

> "Our results support the conclusion that there is no one uniformly best estimating procedure. The appropriate technique depends on the reliability of data, underlying economic structure, and availability of research resources."(8)

What happened that economist arrived at so many explanations and why did some conclude that we really could not establish estimates of the structural parameters for farm real estate prices?

As I see it, we arrived in this dilemma because of a failure to utilize our economic theory, a failure in interpreting and understanding our data system and because our statistical tools had far outstripped the data base to which they were applied.

Prior to the mid-50's, efforts at statistical testing of hypotheses were limited to a few variables, perhaps 2 or 3 independent variables at the most. With the rapid improvements in our computer system, the labor constraint on such tests was removed and we were free to develop large econometric models exploring relationships that had only been remotely associated with land values. Unfortunately our data base did not keep pace with our ability to process and consume data.

Undetered by the scarcity of data suitable for use in systems which required independence, homoskedasticity and normality and unwilling to become involved in the details of sorting out the data problems, researcher proceeded to develop complex rationales for a nonexistent paradox.

One pair of researchers, for example, constructing a model to explain the national index of farmland value per acre, hypothesized that technological change and urbanization were important factors, to represent these in the model they chose the ERS productivity index and a set of 5 year benchmarks on the quanity of land going into urban use with straight line interpolation between the benchmark years.

On the first run of the equation, they found a high correlation between the two variables and because they rightfully concluded that the productivity variable was the stronger, they dropped the urbanization variable from the model. The productivity index would, therefore, be expected to pick-up both effects and if significant they could infer only that the combined impact was important, but, that it was inconclusive as to which variable was actually the most important. However, the results of the studies were reported in the journal under the title, "Technological Change and Land Prices," and it was inferred in the article that technology was the most important factor. To me it is obvious why we continue to ask, what are the relevant factors explaining land values?

To this point, I have attempted to show some of the pitfalls in land market analysis and point out why we need to exercise extreme caution in our analysis. I will now try to lay out some ideas, which to me seem worthy of further exploration and which seem to have a basis in economic theory. To do this, we need to define what we are referring to as a land market and decide what our purposes are for conducting the exploration.

Let me first assert that I accept the theory that land prices are a reflection of the discounted value of a future stream of benefits from the ownership of land and that such benefits accrue because of the income generated from farm production, income generated in nonfarm uses and satisfaction achieved from consumptive or recreational purposes. I also accept that the monetary price of land is affected by the volume and velocity of a broadly defined money supply.

Therefore, the factors that are important in determining future net returns to land from farm and nonfarm sources and the factors that are important in determining the quanity and velocity of the supply of funds are important in explaining land price behavior.

Which of these factors we select for analysis and how we conduct such analysis depends largely on our current and potential data base and on the needs of the decisionmakers who will ultimately use our results.

The banker from Iowa and the farmer who buys Iowa farmland need to know whether the price of a specific tract can be supported by future income flows. That is, will such a price yield a reasonable rate of return, and given the farmer's investment and family goals, how does this tract compare with alternative properties?

Federal policymakers on the other hand, may be concerned over the impact that their policies will have on the value of farmland in general and whether Society in total or certain groups in that society will tend to benefit from their policies?

Although the theory remains the same the basic approach to analysis will differ.

To answer the questions of the farmer and the banker, we need to explore cross sectional data that will determine the relative importance of specific variables on individual tracts or small market areas. We must also explore those factors that are likely to be important in modifying land earnings over time.

For the policymaker, we can concentrate on broad aggregates that will have a pervasive effect throughout the economy in terms of net land returns and monetary flows.

An ideal data base for such analysis might be one that would trace the land income, market value and explanatory variables on specific tracts of land on an annual basis. With the current state of the arts and budget constraints, such a data base is a pipe dream.

We must, therefore, fall back on the current system and look for marginal improvements that will get us to our objective. And, at the same time, be cognizant of the data problems.

If, for example, we attempt to use the national index of value per acre as a dependent variable in a model explaining real estate price changes, we must recognize that all regional variation has been lost in the overall average. Only those factors that are of national significants and that are pervase over time would be captured in the data series. We must also recognize the strong possibility of spurious correlation with any upward trending variable and the relatively variance free national index where the only variance left to explain is the trend over time.

I have suggested before, and Melichar believes I am talking at least half in jest, that changes in the broadly defined money supply and in the population provide a satisfactory explanation of farm real estate price behavior at the national level. In such a model, population changes represent the demand and income factors in the model while money supply represents the general inflationar forces. Such a model would infer that over the long run with an increasing population (and, therefore, an increasing demand for food and space) and with an explicit national policy of economic growth (which includes implicitly a continue rate of inflation of no less than 2 to 3 percent) land prices must ultimately continue to increase. This is not to say that short run periods of stability or decline will not occur because of a failure to achieve our objective in terms of continued economic growth or because short run surplus situations reduce land earnings.

In the short run, we can expect that land earnings and therefore, land prices will continue to be affected by factors which reduce production costs, increase output, improve economic efficiency, and modify current and future farm commodity prices.

We can also anticipate short run and localized swings in land prices in response to changes in expected revenues from nonfarm use and from changes in the cost of using land in a consumptive purpose.

The relevant theory in explaining farmland values is therefore that which explains land earnings and land buyers expectations of land earnings and utility from consumption uses. Also, the theory which explains the relationship between the medium of exchange and the price of the good to be exchanged.

The relevant variables to include in a modeling framework to test the theory can only be determined by rational economic argument. The relevant data to represent the structural variables can only be determine by careful study of the data base to understand the limitations of the data.

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(2) Stauber, B.R. "The Farm Real Estate Situation," Circular No. 309, USDA, December 1933.

(3) Johnson, A.R., "The Farm Real Estate Situation," 1946-47, Circular No. 780, USDA, March 1948.

(4) ARS-USDA, Current Developments in the Farm Real Estate Market, ARS 43-67, CD-48, November 1957.

(5) ERS, USDA, Farm Real Estate Market Developments, CD-66, October 1964.

(6) Rossmiller, George E., Farm Real Estate Patterns in the United States, 1930-62, Department of Agricultural Economics, Michigan State University, Agr. Econ. Report No. 31, November 1965.

(7) Reynolds, John E., An Econometric Investigation of Farmland Values in the United States, Ph.D. Thesis, Iowa State University, Ames (Mic 67 5615 University Microfilms, Ann Arbor,Michigan) 1966.

(8) Tweeten, Luther G, and Marlin, James E., A Methodology for Predicting U.S. Farm Real Estate Price Variation, Journal Farm Econ., 48: 378-393, 1966.